

CLAIMS:

1. An antenna structure comprising a dielectric pellet and a dielectric substrate with upper and lower surfaces and at least one groundplane, wherein the dielectric pellet is elevated above the upper surface of the dielectric substrate such that the dielectric pellet does not directly contact the dielectric substrate or the groundplane, the dielectric pellet being provided with an electrically-conductive direct feed structure, and wherein the antenna structure additionally comprises a radiating antenna component which is elevated above the upper surface of the dielectric substrate and has a surface that faces a surface of the dielectric pellet.
2. An antenna structure as claimed in claim 1, wherein the electrically-conductive direct feed structure extends from the upper surface of the dielectric substrate and directly contacts the dielectric pellet.
3. An antenna structure as claimed in claim 2, wherein the electrically-conductive direct feed structure physically supports the dielectric pellet.
4. An antenna structure as claimed in claim 2, wherein the dielectric pellet is physically supported or elevated above the groundplane or the dielectric substrate by a low permittivity antenna support structure.
5. An antenna structure as claimed in any preceding claim, wherein the electrically-conductive direct feed structure is a conducting leg, a spring-loaded pin, a metal strip or a metal ribbon.
6. An antenna structure as claimed in any preceding claim, wherein the electrically-conductive direct feed structure is directly attached to at least one side or surface of the dielectric pellet.

7. An antenna structure as claimed in claim 6, wherein the electrically-conductive direct feed structure is directly attached to more than one side or surface of the dielectric pellet.
- 5 8. An antenna structure as claimed in claim 7, wherein the dielectric pellet is contained in an electrically-conductive cup or cage, and wherein the electrically-conductive direct feed structure is electrically connected to the cup or cage.
- 10 9. An antenna structure as claimed in any one of claims 1 to 5, wherein at least one side or surface of the dielectric pellet is metallised, and wherein the electrically-conductive direct feed structure is soldered or otherwise electrically connected to the metallised side or surface.
- 15 10. An antenna structure as claimed in claim 1, wherein the electrically-conductive direct feed structure is a spring-loaded pin extending upwardly from the upper surface of the dielectric substrate, wherein the dielectric pellet has a metallised underside that faces the upper surface of the dielectric substrate, and wherein a tip or tips of the spring loaded pin electrically contact the metallised underside.
- 20 11. An antenna structure as claimed in any preceding claim, wherein the radiating antenna component is an electrically-conductive antenna component.
12. An antenna structure as claimed in claim 11, wherein the radiating antenna component is selected from a group consisting of: patch antenna, slot antenna, 25 monopole antenna, dipole antenna, planar inverted-L antenna and planar inverted-F antenna.
13. An antenna structure as claimed in any one of claims 1 to 10, wherein the radiating antenna component is a dielectrically loaded antenna component.

14. An antenna structure as claimed in claim 13, wherein the radiating antenna component is configured as a planar inverted-L antenna with a radiating structure extending over a block of dielectric material such as a dielectric ceramic material.

5 15. An antenna structure as claimed in claim 11, wherein the radiating antenna component is a planar inverted-L antenna having a radiating surface and a shorting pin connected to the groundplane, and wherein the dielectric pellet is disposed remote from the shorting pin so as to provide a low capacitance feed.

10 16. An antenna structure as claimed in claim 11, wherein the radiating antenna component is a planar inverted-L antenna having a radiating surface and a shorting pin connected to the groundplane, and wherein the dielectric pellet is disposed adjacent to the shorting pin so as to provide a high capacitance feed.

15 17. An antenna structure as claimed in any preceding claim, wherein the radiating antenna component is provided with an independent feed.

18. An antenna structure as claimed in claim 17, wherein the radiating antenna component is a planar inverted-F antenna.

20 19. An antenna structure as claimed in any preceding claim, further comprising at least one additional radiating antenna component having a surface that faces a surface of the dielectric pellet.

25 20. An antenna structure as claimed in any preceding claim, wherein there is provided more than one dielectric pellet.

21. An antenna structure as claimed in any preceding claim, wherein the groundplane is located on the lower surface of the dielectric substrate.

22. An antenna structure as claimed in any one of claims 1 to 20, wherein the groundplane is located on the upper surface of the dielectric substrate.

23. An antenna structure as claimed in any one of claims 1 to 20, wherein a first
5 groundplane is located on the upper surface of the dielectric substrate and a second
groundplane is located on the lower surface of the dielectric substrate.

24. An antenna structure as claimed in any one of claims 1 to 20, wherein at least
one groundplane is sandwiched between the upper and lower surfaces of the
10 dielectric substrate.

25. An antenna structure as claimed in any preceding claim, wherein the
groundplane extends across at least that part of the dielectric substrate that is located
directly below the elevated dielectric pellet.

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26. An antenna structure as claimed in any preceding claim, wherein the
groundplane extends across substantially an entire area of the dielectric substrate.

27. An antenna structure as claimed in any one of claims 1 to 24, wherein the
20 groundplane is absent from an area of the dielectric substrate that is located below the
dielectric pellet.

28. An antenna structure as claimed in any preceding claim, wherein a gap
defined between the dielectric pellet and the upper surface of the dielectric substrate
25 is filled with a solid dielectric filler with a dielectric constant less than that of the
dielectric pellet.

29. An antenna structure as claimed in claim 28, wherein the solid dielectric filler
has a dielectric constant not more than 10% of that of the dielectric pellet.

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30. An antenna structure substantially as hereinbefore described with reference to or as shown in the accompanying drawings.